

### **REMARKS**

The Office Action dated May 13, 2010 has been received and carefully noted. The following remarks are submitted as a full and complete response thereto.

Claims 1-33 and 35-41 are currently pending in the application. Claim 34 was previously cancelled. Applicants thank the Examiner for the allowance of claims 39-41. Accordingly, claims 1-33 and 35-38 are respectfully submitted for consideration.

#### ***Allowable Subject Matter***

The Office Action indicated that claims 7, 15, and 20-21 would be allowable if rewritten to include all of the limitations of the base claims and any intervening claims. Applicants respectfully thank the Examiner for the indication of allowability for claims 7, 15, and 20-21. Claims 7, 15, and 20-21 depend upon independent claim 1, and recite additional subject matter. As will be described below in more detail, independent claim 1 recites allowable subject matter. Accordingly, it is respectfully requested that claims 7, 15, and 20-21 be allowed.

The Office Action indicated that claims 39-41 have been allowed. Applicants respectfully thank the Examiner for the allowance of the claims.

***Claim Rejections Under 35 U.S.C. § 103***

The Office Action rejected claims 1-2, 22, 23, and 26-38 under 35 U.S.C. § 103(a) as being unpatentable over Brunner (U.S. Patent No. 7,039,368) (“Brunner”), in view of Rouquette et al. (U.S. Patent No. 7,308,035) (“Rouquette”). The Office Action took the position that Brunner discloses all the elements of the claims with the exception of “wherein two transmit diversity branches for use based on estimated channel properties and determining, in the operational entity of the communication network, a transmit diversity order of the at least two transmit diversity branches.” The Office Action then cited Rouquette as allegedly curing the deficiencies of Brunner. Claim 34 was previously cancelled, and thus, the rejection is moot with respect to that claim. With respect to the other claims, Applicants respectfully traverse this rejection. Applicants’ remarks regarding whether Brunner qualifies as prior art from the previous response, dated February 4, 2010, are incorporated by reference herein.

Brunner describes a method which allows a transmitter in a radio communications system to control a downlink beam based on the current transmission and reception situation. The method can be carried out in a base station in a radio communications system which has an antenna device with a number of antenna elements. In the method, a received uplink signal from a subscriber station is investigated for the existence of phase correlation between components of the uplink signal. If phase correlation is established, it is determined whether there is a direct transmission link between the base station and

the subscriber station. If there is a direct transmission link the downlink signal is transmitted along the direct transmission path. If no direct transmission link is established, then the downlink signal is transmitted simultaneously at least two of the transmission paths. However, if no phase correlation is established, the downlink signal is transmitted non-directionally, potentially using at least one diversity technique (see Brunner at col. 3, line 36 – col. 4, line 16; Figure 3).

Rouquette describes a method of transmitting data from a transmitter to a remote receiver using transmit diversity wireless communication. The transmitter includes three or more transmit antenna elements. The data is encoded in symbol blocks. The symbols of a block are permuted within respective subsets of symbols between transmit antenna elements over time with respective replications and complex conjugations and/or negations. The signals transmitted over at least one of the transmit antenna elements are modified as a function of channel information at least approximate related to the channel transfer function of the transmitted signals. The sub-sets of symbols and permuted symbols are permuted over time between the sub-sets of transmit antenna elements, so that the received signal is detectable at the receiver using an orthogonal detection matrix scheme (see Rouquette at Abstract).

Applicants respectfully submit that Brunner and Rouquette, whether considered individually or in combination, fail to disclose, teach, or suggest, all of the elements of the present claims. For example, the combination of Brunner and Rouquette fails to

disclose, teach, or suggest, at least, “determining, in the operational entity of the communication network, a transmit diversity order of the at least two transmit diversity branches,” as recited in independent claim 1, and similar limitations recited in independent claims 29 and 37-38, which have their own unique scope.

Brunner merely describes a method for controlling a downlink beam in a radio communication system having an antenna device including a number of antennal elements (see Brunner at claim 1). The method includes investigating a received uplink signal from a transmitter for the existence of phase correlation between components of the uplink signal received by different antenna elements in the antenna device (see *id.*). The method also includes, if phase correlation exists, associating at least one source direction with the uplink signal and transmitting the downlink signal directionally in the source direction (see *id.*). The method also includes, if no phase correlation exists, transmitting the downlink signal non-directionally in the form of a number of contributions produced using at least one diversity technique (see *id.*). Applicants respectfully submit that Brunner is silent as to the features of “determining a transmit diversity order” and “determining at least two transmit diversity branches for use,” and thus, Brunner fails to disclose or suggest the aforementioned limitation of independent claim 1, and similar limitations recited in independent claims 29 and 37-38.

Furthermore, Rouquette does not cure the deficiencies of Brunner. Rouquette describes that, in a system for transmitting data by a transmit diversity wireless

communication network, a function of a transfer coefficient is used to provide weights which are multiplied by a signal to be transmitted, and that there is a weight for each transmit antenna element. The signal may be modified in phase and/or amplitude as a function of the channel state information (see Rouquette at col. 4, lines 49-59). However, Rouquette does not teach, “determining, in the operational entity of the communication network, a transmit diversity order of the at least two transmit diversity branches.”

The Office Action took the position that “a diversity order characterizes a number of transmit and receive antennas which is actually seen by the code, and that the more transmit antenna elements are implemented, the more improvement is obtained in terms of fading and interference” (see Office Action at page 3). Thus, it appears that the Office Action is taking the position that the mere fact that Rouquette describes multiple transmit antenna elements also means that Rouquette teaches “determining ... a transmit diversity order of ... at least two transmit diversity branches.” Applicants respectfully submit that the Office Action’s position is incorrect. Rouquette teaches utilizing all antenna elements for a transmit part simultaneously. In other words, Rouquette teaches utilizing all diversity branches for all mobile stations (see Rouquette at col. 4, lines 49-59). However, independent claim 1 recites “determining ... at least two transmit diversity branches for use ... based on estimated channel properties,” and “determining ... a transmit diversity order of the at least two transmit diversity branches.” Independent

claims 29 and 37-38 recite similar limitations. Thus, according to an embodiment of the invention, specific transmit diversity branches from a set of available diversity branches (i.e., a “diversity order”) may be determined for a specific mobile station. Furthermore, according to the embodiment of the invention, a transmit diversity order can be adapted based on a received channel estimation during an operating communication link. Thus, a determination of a diversity order can be initiated based on a received channel estimation. In contrast, Rouquette and Brunner are silent as to changing a transmit diversity order during the operation of a communication link.

The Office Action further took the position that “it would be obvious to one of ordinary skill in the art to implement the multiple branches and diversity order specifically disclosed by Rouquette to the transmit diversity system of Brunner in order [to] determine by coefficient weight measurement, which transmit diversity branch to utilize of the Brunner system (see Office Action at page 3, emphasis added). Applicants respectfully submit that this position is also incorrect. The disclosure of Rouquette merely mentions “diversity order” in the Background section, in the context of other publications, and fails to teach or suggest that a system for transmitting data described at col. 4 of Rouquette determines a diversity order of at least two transmit diversity branches. Furthermore, Rouquette utilizes coefficient weight measurements to modify a signal to be transmitted, yet Brunner is silent as to coefficient weight measurements.

Thus, one of ordinary skill in the art would not look to Rouquette to cure the deficiencies of Brunner in an attempt to arrive at the claims of the present application.

Therefore, the combination of Brunner and Rouquette fails to disclose, teach, or suggest, all of the elements of independent claims 1, 29, and 37-38.

Claims 2, 22-23, and 26-28 depend upon independent claim 1. Claims 30-33 and 35-36 depend upon independent claim 29. Thus, Applicants respectfully submit that claims 2, 22-23, 26-28, 30-33, and 35-36 should be allowed for at least their dependence upon independent claims 1 and 29, respectively, and for the specific elements recited therein.

Accordingly, Applicants respectfully request that this rejection be withdrawn.

The Office Action rejected claim 3 under 35 U.S.C. § 103(a) as being unpatentable over Brunner in view of Rouquette, and in view of Rappaport (U.S. 5,233,628) (“Rappaport”). The Office Action took the position that the combination of Brunner and Rouquette discloses all the elements of the claims with the exception of “wherein the determining comprises using the transmit diversity performance indicator taking into account one or more of the following: small-scale fading statistics, and specific channel coding.” The Office Action then cited Rappaport as allegedly curing the deficiencies of Brunner and Rouquette. Applicants respectfully traverse this rejection.

Brunner and Rouquette are described above. Rappaport describes a communications stimulation system that allows a user to perform a quantitative or

subjective test of digital baseband devices over wireless channels using actual measured or modeled propagation data. The digital wireless communication simulation system is capable of simulating the transient nature of channels and radio hardware so that loss of synchronization can be included in the simulation (see Rappaport at Abstract).

Claim 3 depends upon independent claim 1. As discussed above, the combination of Brunner and Rouquette does not disclose, teach, or suggest all of the elements of independent claim 1. Furthermore, Rappaport does not cure the deficiencies in Brunner and Rouquette, as Rappaport also does not disclose, teach, or suggest, at least, “determining, in the operational entity of the communication network, a transmit diversity order of the at least two transmit diversity branches,” as recited in independent claim 1. Thus, the combination of Brunner, Rouquette, and Rappaport does not disclose, teach, or suggest all of the elements of claim 3. Additionally, claim 3 should be allowed for at least its dependence upon independent claim 1, and for the specific elements recited therein.

The Office Action rejected claim 4 under 35 U.S.C. § 103(a) as being unpatentable over Brunner, in view of Rouquette, and in view of Veeravalli (U.S. Patent No. 6,097,956) (“Veeravalli”). The Office Action took the position that the combination of Brunner and Rouquette discloses all the elements of the claims with the exception of “wherein the ... determining the at least one transmit diversity branch for use comprises taking into account a required outage probability.” The Office Action then cited



Veeravalli as allegedly curing the deficiencies of Brunner and Rouquette. Applicants respectfully traverse this rejection. Brunner and Rouquette are described above. Veeravalli describes calculation of the probability of outage for a cell within a CDMA network utilized to relate cell coverage to cell capacity. Based on a desired probability of outage, the coverage of the cell may be calculated for an average number of users within the cell (see Veeravalli at Abstract).

Claim 4 depends upon independent claim 1. As discussed above, the combination of Brunner and Rouquette does not disclose, teach, or suggest all of the elements of independent claim 1. Furthermore, Veeravalli does not cure the deficiencies in Brunner and Rouquette, as Veeravalli also does not disclose, teach, or suggest, at least, “determining, in the operational entity of the communication network, a transmit diversity order of the at least two transmit diversity branches,” as recited in independent claim 1. Thus, the combination of Brunner, Rouquette, and Veeravalli does not disclose, teach, or suggest all of the elements of claim 4. Additionally, claim 4 should be allowed for at least its dependence upon independent claim 1, and for the specific elements recited therein.

The Office Action rejected claims 5, 6, 8, and 10-11 under 35 § U.S.C. 103(a) as being unpatentable over Brunner, in view of Rouquette, and in view of Lindell (U.S. Patent No. 5,524,275) (“Lindell”). The Office Action took the position that the combination of Brunner and Rouquette discloses all the elements of the claims with the

exception of “wherein the step of determining comprises determining the at least one transmit diversity branch for use based on said estimated channel properties comprising expected powers of transmit diversity branches.” The Office Action then cited Lindell as allegedly curing the deficiencies of Brunner and Rouquette. Applicants respectfully traverse this rejection.

Brunner and Rouquette are described above. Lindell describes a radio transmitter output power controller which automatically restricts the maximum transmitting time during an averaging time so that the average power remains below an acceptable level. The maximum transmitter output power may be automatically reduced to a lower level if and when a predetermined average power level is approached (see Lindell at Abstract).

Claims 5, 6, 8, and 10-11 depend upon independent claim 1. As discussed above, the combination of Brunner and Rouquette does not disclose, teach, or suggest all of the elements of independent claim 1. Furthermore, Lindell does not cure the deficiencies in Brunner and Rouquette, as Lindell also does not disclose, teach, or suggest, at least, “determining, in the operational entity of the communication network, a transmit diversity order of the at least two transmit diversity branches,” as recited in independent claim 1. Thus, the combination of Brunner, Rouquette, and Lindell does not disclose, teach, or suggest all of the elements of claims 5, 6, 8, and 10-11. Additionally, claims 5, 6, 8, and 10-11 should be allowed for at least their dependence upon independent claim 1, and for the specific elements recited therein.

The Office Action rejected claim 9 under 35 U.S.C. § 103(a) as being unpatentable over Brunner, in view of Rouquette, in view of Lindell, and in further view of Conklin (U.S. Patent No. 6,415,283) (“Conklin”). The Office Action took the position that the combination of Brunner, Rouquette and Lindell discloses all the elements of the claims with the exception of “wherein the step of evaluating comprises evaluating said transmit diversity performance indicator for transmit diversity branch sets using a tree structure, a transmit diversity branch set relating to a child node having less transmit diversity branches than a transmit diversity branch set relating to a parent node of the child node.” The Office Action then cited Conklin as allegedly curing the deficiencies of Brunner, Rouquette and Lindell. Applicants respectfully traverse this rejection.

Brunner, Rouquette and Lindell are described above. Conklin describes a cluster processing system that determines at least one focal node on a hierarchically arranged tree structure of nodes based on attributes of a data set. The data set comprises a plurality of data set attributes with associated weight values. The cluster processing system selects a set of nodes from the tree structure with tree structure attributes that correspond with the data set attributes, and then assigns quantitative values to nodes in the set of nodes from the weight values in the data set. At least one cluster of nodes are selected, based on proximity in the tree structure, and at least one focal node on the tree structure for the cluster of nodes is selected. (see Conklin at Abstract).

Claim 9 depends upon independent claim 1. As discussed above, the combination of Brunner, Rouquette and Lindell does not disclose, teach, or suggest all of the elements of independent claim 1. Furthermore, Conklin does not cure the deficiencies in Brunner, Rouquette and Lindell, as Conklin also does not disclose, teach, or suggest, at least, “determining, in the operational entity of the communication network, a transmit diversity order of the at least two transmit diversity branches,” as recited in independent claim 1. Thus, the combination of Brunner, Rouquette and Lindell does not disclose, teach, or suggest all of the elements of claim 9. Additionally, claim 9 should be allowed for at least its dependence upon independent claim 1, and for the specific elements recited therein.

The Office Action rejected claims 12-14, 16, and 18-19 under 35 U.S.C. § 103(a) as being unpatentable over Brunner, in view of Rouquette, and in view of Mitra (U.S. Patent No. 5,956,649) (“Mitra”). The Office Action took the position that the combination of Brunner and Rouquette discloses all the elements of the claims with the exception of “wherein the step of determining comprises determining the at least one transmit diversity branch for use based on the estimated channel properties comprising second order statistics of channel coefficients of transmit diversity branches.” The Office Action then cited Mitra as allegedly curing the deficiencies of Brunner and Rouquette. Applicants respectfully traverse this rejection.

Brunner and Rouquette are described above. Mitra describes a method and apparatus that use a set of parameters characterizing an interference signal at a base unit for determining power levels for signals transmitted from a communications device to the base unit. The set of parameters comprises second or higher order statistics characterizing the interference signal, and the parameters are used to determine a desired power level for signals received at the base unit. The desired power level is communicated to a communications device via a pilot signal transmitted by the base unit at a predetermined level. The predetermined level and the power of the received pilot signal are used to compute a path gain between the base unit and communications device. The path gain and desired power level are then used to determine the power level of signals transmitted from the communications device to the base unit (see Mitra at Abstract).

Claims 12-14, 16, and 18-19 depend upon independent claim 1. As discussed above, Brunner and Rouquette does not disclose, teach, or suggest all of the elements of independent claim 1. Furthermore, Mitra does not cure the deficiencies in Brunner and Rouquette, as Mitra also does not disclose, teach, or suggest, at least, “determining, in the operational entity of the communication network, a transmit diversity order of the at least two transmit diversity branches,” as recited in independent claim 1. Thus, the combination of Brunner, Rouquette and Mitra does not disclose, teach, or suggest all of the elements of claims 12-14, 16, and 18-19. Additionally, claims 12-14, 16, and 18-19

should be allowed for at least their dependence upon independent claim 1, and for the specific elements recited therein.

The Office Action rejected claim 17 under 35 U.S.C. § 103(a) as being unpatentable over Brunner, in view of Rouquette, in view of Mitra and further in view of Conklin. The Office Action took the position that the combination of Brunner, Rouquette, and Mitra discloses all the elements of the claims with the exception of “wherein the step of evaluating comprises evaluating said transmit diversity performance indicator for transmit diversity branch sets using a tree structure, a transmit diversity branch set relating to a child node having less transmit diversity branches than a transmit diversity branch set relating to a parent node of the child node.” The Office Action then cited Conklin as allegedly curing the deficiencies of Brunner, Rouquette, and Mitra. Applicants respectfully traverse this rejection.

Brunner, Rouquette, Mitra, and Conklin are described above. Claim 17 depends upon independent claim 1. As discussed above, the combination of Brunner, Rouquette, and Mitra does not disclose, teach, or suggest all of the elements of independent claim 1. Furthermore, Conklin does not cure the deficiencies in Brunner, Rouquette, and Mitra, as Conklin also does not disclose, teach, or suggest, at least, “determining, in the operational entity of the communication network, a transmit diversity order of the at least two transmit diversity branches,” as recited in independent claim 1. Thus, the combination of Brunner, Rouquette, Mitra, and Conklin does not disclose, teach, or suggest all of the

elements of claim 17. Additionally, claim 17 should be allowed for at least its dependence upon independent claim 1, and for the specific elements recited therein.

The Office Action rejected claims 24 and 25 under 35 U.S.C. § 103(a) as being unpatentable over Brunner, in view of Rouquette, and in view of Whinnet (U.S. Patent No. 6,317,411) (“Whinnet”). The Office Action took the position that the combination of Brunner and Rouquette discloses all the elements of the claims with the exception of “estimating channel properties using channel coefficients at a receiver.” The Office Action then cited Whinnet as allegedly curing the deficiencies of Brunner and Rouquette. Applicants respectfully traverse this rejection.

Brunner and Rouquette are described above. Whinnett describes a method for wireless data communication between a base station and a subscriber unit in a wireless communication system. Groups of symbols of an input data stream are commutated to produce a plurality of commutated data streams. The plurality of commutated data streams are then transformed to produce a plurality of transformed data streams. Next, each transformed data stream is spread with a selected one of a plurality of spreading codes to produce a plurality of antenna signals. Finally, each of the plurality of antenna signals is transmitted using a selected one of a plurality of spaced apart antennas, wherein the plurality of spaced apart antennas are spaced apart to provide transmit diversity. In one embodiment, the transform is a space-time transform (see Whinnett at Abstract).

Claims 24 and 25 depend upon independent claim 1. As discussed above, the combination of Brunner and Rouquette does not disclose, teach, or suggest all of the elements of independent claim 1. Furthermore, Whinnett does not cure the deficiencies in Brunner and Rouquette, as Whinnett also does not disclose, teach, or suggest, at least, “determining, in the operational entity of the communication network, a transmit diversity order of the at least two transmit diversity branches,” as recited in independent claim 1. Thus, the combination of Brunner, Rouquette, and Whinnett does not disclose, teach, or suggest all of the elements of claims 24 and 25. Additionally, claims 24 and 25 should be allowed for at least their dependence upon independent claim 1, and for the specific elements recited therein.

Based on the above discussion, Applicants respectfully submit that the cited prior art references fail to disclose or suggest all of the elements of the claimed invention. These distinctions are more than sufficient to render the claimed invention unanticipated and unobvious. It is therefore respectfully requested that all of claims 1-33 and 35-38 be allowed, and this application passed to issue.

If for any reason the Examiner determines that the application is not now in condition for allowance, it is respectfully requested that the Examiner contact, by telephone, the applicants' undersigned representative at the indicated telephone number to arrange for an interview to expedite the disposition of this application.



In the event this paper is not being timely filed, the applicants respectfully petition for an appropriate extension of time. Any fees for such an extension together with any additional fees may be charged to Counsel's Deposit Account 50-2222.

Respectfully submitted,

/Keith M. Mullervy/  
Keith M. Mullervy  
Registration No. 62,382

**Customer No. 32294**  
SQUIRE, SANDERS & DEMPSEY LLP  
14<sup>TH</sup> Floor  
8000 Towers Crescent Drive  
Vienna, Virginia 22182-6212  
Telephone: 703-720-7800  
Fax: 703-720-7802

KMM:sew:jf